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(54) **SYSTEMS AND METHODS FOR UPDATING CONTENT DETECTION DEVICES AND SYSTEMS**

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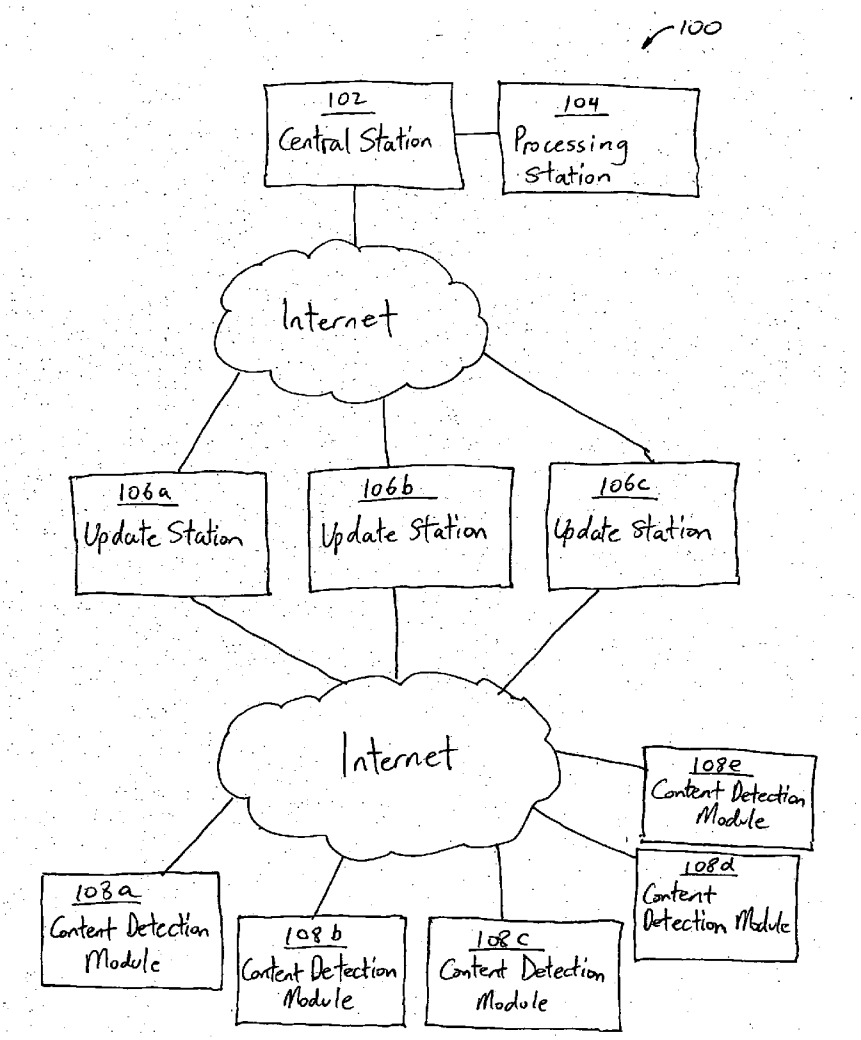
(57) **ABSTRACT**

A method of updating a content detection module includes obtaining content detection data, and transmitting the content detection data to a content detection module, wherein the transmitting is performed not in response to a request from the content detection module. A method of sending content detection data includes obtaining content detection data, selecting an update station from a plurality of update stations, and sending the content detection data to the selected update station. A method of building a content detection system includes establishing a first communication link between a central station and an update station, the central station configured to transmit content detection data to the update station, and establishing a second communication link between the update station and a content detection module.



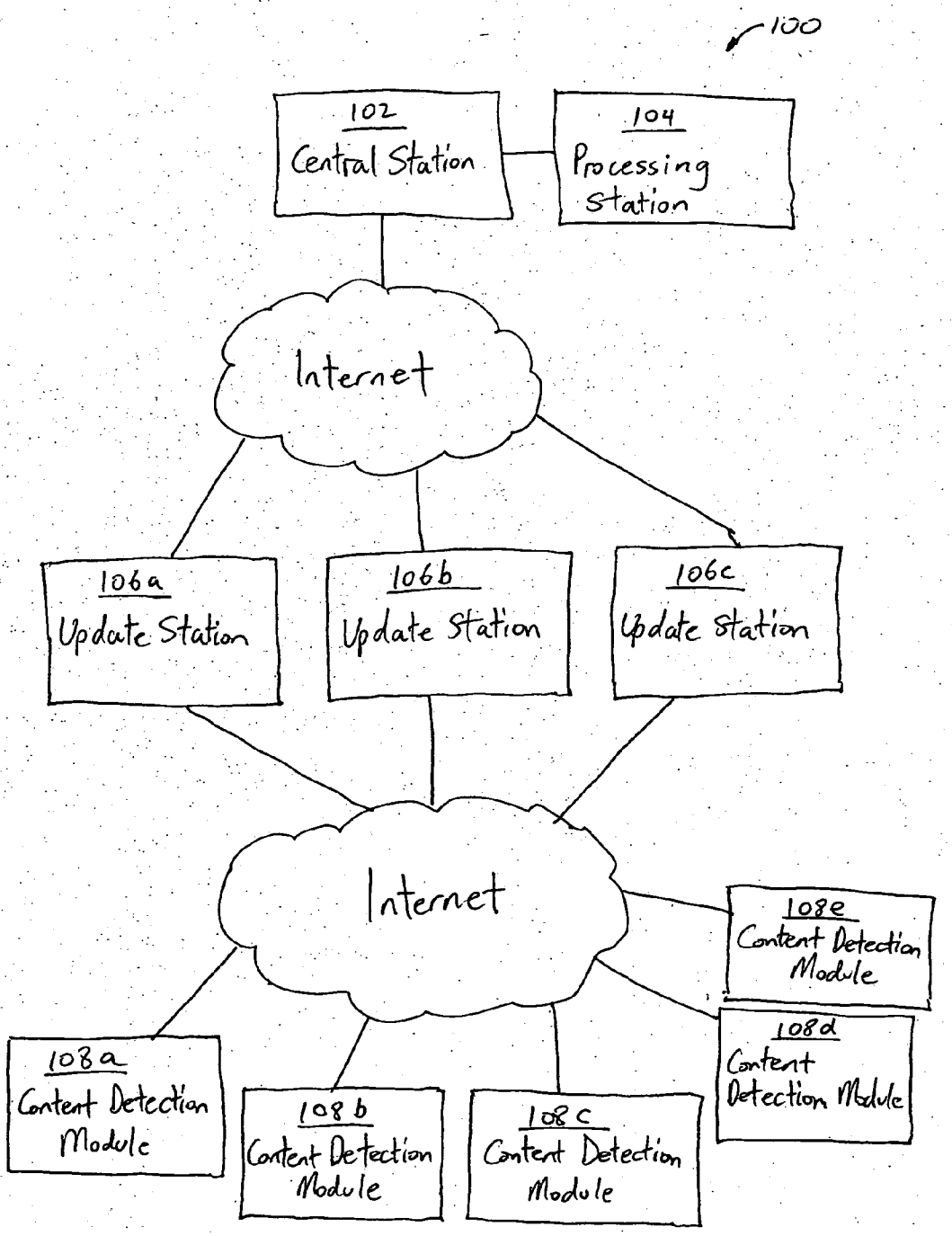

100
102
Central Station
104
Processing Station
Internet
106a
Update Station
106b
Update Station
106c
Update Station
Internet
108e
Content Detection Module
108d
Content Detection Module
108a
Content Detection Module
108b
Content Detection Module
108c
Content Detection Module

FIG. 1

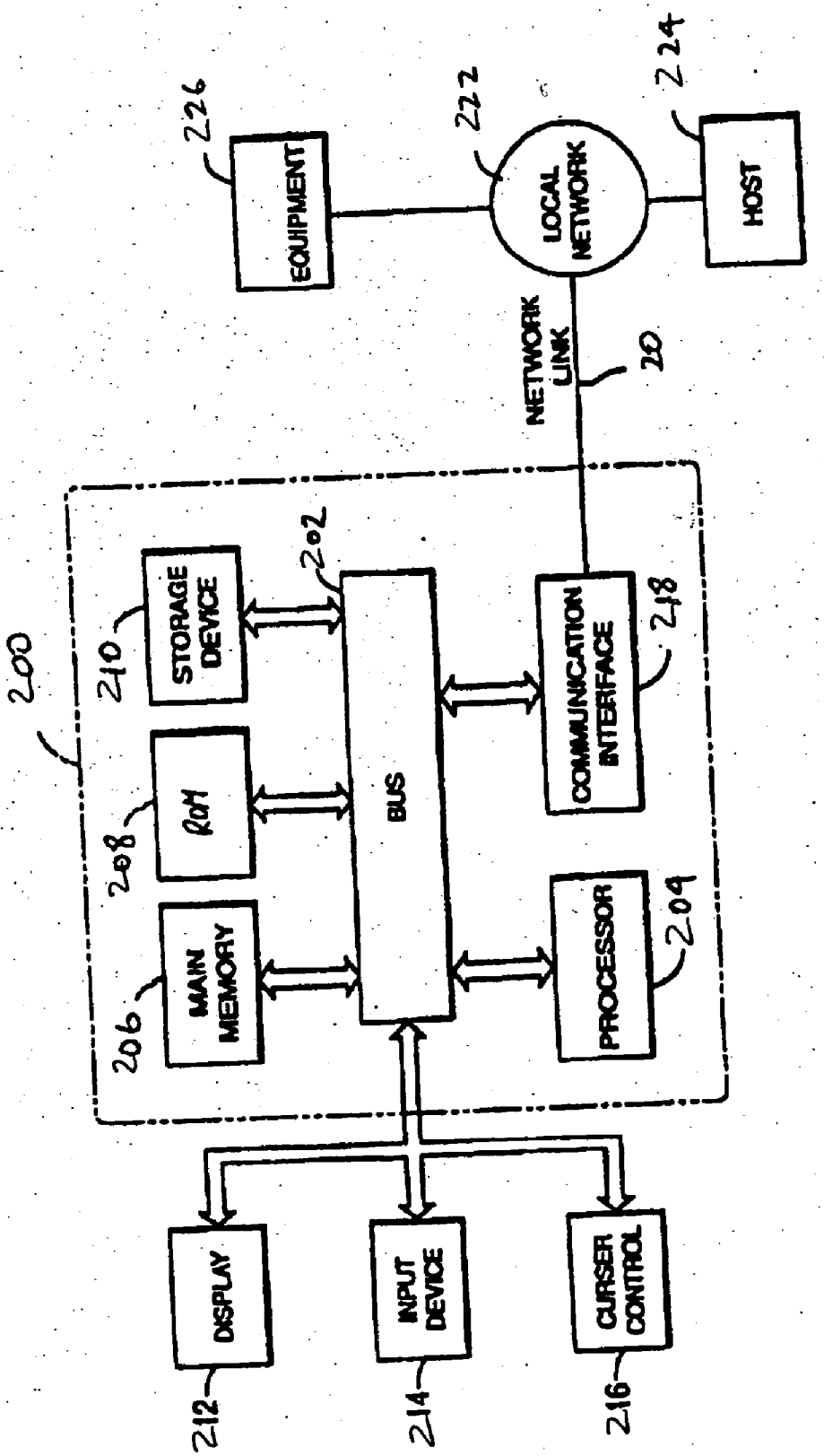

226
EQUIPMENT
222
LOCAL NETWORK
224
HOST
NETWORK LINK
20
200
202
STORAGE DEVICE
210
ROM
208
MAIN MEMORY
206
BUS
COMMUNICATION INTERFACE
218
PROCESSOR
204
DISPLAY
212
INPUT DEVICE
214
CURSER CONTROL
216

FIG. 2

SYSTEMS AND METHODS FOR UPDATING CONTENT DETECTION DEVICES AND SYSTEMS

RELATED APPLICATION DATA

[0001] This application claims priority to U.S. Provisional Patent Application No. 60/552,457, filed on Mar. 12, 2004, the entire disclosure of which is expressly incorporated by reference herein.

BACKGROUND

[0002] 1. Field of the Invention

[0003] The field of the invention relates to computer network and computer systems, and more particularly, to systems and methods for updating content detection modules.

[0004] 2. Background

[0005] The generation and spreading of computer viruses are major problems in computer systems and computer networks. A computer virus is a program that is capable of attaching to other programs or sets of computer instructions, replicating itself, and/or performing unsolicited or malicious actions on a computer system. Viruses may be embedded in email attachments, files downloaded from Internet, and macros in MS Office files. The damage that can be done by a computer virus may range from mild interference with a program, such as a display of unsolicited messages or graphics, to complete destruction of data on a user's hard drive or server.

[0006] To provide protection from viruses, most organizations have installed virus scanning software on computers in their network. However, these organizations may still be vulnerable to a virus attack until every host in their network has received updated anti-virus software. With new attacks reported almost weekly, organizations are constantly exposed to virus attacks, and spend significant resources ensuring that all hosts are constantly updated with new anti-virus information. For example, with existing content detection software, a user may have to request for a download of a new virus signature in order to enable the content detection software to detect new virus that has been created since the last update. If a user delays in downloading the new virus signature, the content detection software would be unable to detect the new virus. Also, with existing content detection systems, new virus signatures are generally not made available shortly after they are discovered. As such, a computer mat be subjected to attack by the new virus until the new virus signature is available and is downloaded by a user.

[0007] Besides virus attacks, many organizations also face the challenge of dealing with inappropriate content, such as email spam, misuse of networks in the form of browsing or downloading inappropriate content, and use of the network for non-productive tasks. Many organizations are struggling to control access to appropriate content without unduly restricting access to legitimate material and services. Currently, the most popular solution for blocking unwanted web activity is to block access to a list of banned or blacklisted web sites and pages based on their URLs. However, as with virus scanning, the list of blocked URL requires constant updating. If a user delays in downloading the list of URL, or if the list of URL is not made available soon enough, the content detection software would be unable to detect undesirable content, such as web pages.

[0008] Many email spam elimination systems also use blacklists (spammer lists) to eliminate unwanted email messages. These systems match incoming email messages against a list of mail servers that have been pre-identified to be spam hosts, and prevent user access of messages from these servers. However, as with virus scanning, the spammer list also requires constant updating. If a user delays in downloading the spammer list, or if the spammer list is not made available soon enough, the content detection software would be unable to detect undesirable content.

SUMMARY

[0009] In accordance with some embodiments, a method of updating a content detection module includes obtaining content detection data, and transmitting the content detection data to a content detection module, wherein the transmitting is performed not in response to a request from the content detection module.

[0010] In accordance with other embodiments, a system for updating a content detection module includes means for obtaining content detection data, and means for transmitting the content detection data to a content detection module, wherein the means for transmitting is configured to perform the transmitting not in response to a request from the content detection module.

[0011] In accordance with other embodiments, a computer-program product having a medium, the medium having a set of instructions readable by a processor, an execution of the instructions by the processor causes a process to be performed, the process includes obtaining content detection data, and transmitting the content detection data to a content detection module, wherein the transmitting is performed not in response to a request from the content detection module.

[0012] In accordance with other embodiments, a content detection system includes a station having a computer-readable medium for storing content detection data, the content detection data usable by a content detection module to detect content, wherein the station is configured to transmit the content detection data not in response to a request by the content detection module.

[0013] In accordance with other embodiments, a method of sending content detection data includes determining whether a first update station received the content detection data, and sending the content detection data to the first update station if the first update station did not receive the content detection data.

[0014] In accordance with other embodiments, a system for sending content detection data includes means for determining whether a first update station received the content detection data, and means for sending the content detection data to the first update station if the first update station did not receive the content detection data.

[0015] In accordance with other embodiments, a computer-program product having a medium, the medium having a set of instructions readable by a processor, an execution of the instructions by the processor causes a process to be performed, the process includes determining whether a

first update station received the content detection data, and sending the content detection data to the first update station if the first update station did not receive the content detection data.

[0016] In accordance with other embodiments, a method of sending content detection data includes obtaining content detection data, selecting an update station from a plurality of update stations, and sending the content detection data to the selected update station.

[0017] In accordance with other embodiments, a system for sending content detection data includes means for obtaining content detection data, means for selecting an update station from a plurality of update stations, and means for sending the content detection data to the selected update station.

[0018] In accordance with other embodiments, a computer-program product having a medium, the medium having a set of instructions readable by a processor, an execution of the instructions by the processor causes a process to be performed, the process includes obtaining content detection data, selecting an update station from a plurality of update stations, and sending the content detection data to the selected update station.

[0019] In accordance with other embodiments, a method of building a content detection system includes establishing a first communication link between a central station and an update station, the central station configured to transmit content detection data to the update station, and establishing a second communication link between the update station and a content detection module.

[0020] In accordance with other embodiments, a system for building a content detection system includes means for establishing a first communication link between a central station and an update station, the central station configured to transmit content detection data to the update station, and means for establishing a second communication link between the update station and a content detection module.

[0021] In accordance with other embodiments, a computer-program product having a medium, the medium having a set of instructions readable by a processor, an execution of the instructions by the processor causes a process to be performed, the process includes establishing a first communication link between a central station and an update station, the central station configured to transmit content detection data to the update station, and establishing a second communication link between the update station and a content detection module.

[0022] Other aspects and features of the invention will be evident from reading the following detailed description of the preferred embodiments, which are intended to illustrate, not limit, the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] The drawings illustrate the design and utility of preferred embodiments of the application, in which similar elements are referred to by common reference numerals. In order to better appreciate how advantages and objects of various embodiments are obtained, a more particular description of the embodiments are illustrated in the accompanying drawings. Understanding that these drawings depict only typical embodiments of the application and are not therefore to be considered limiting its scope, the embodiments will be described and explained with additional specificity and detail through the use of the accompanying drawings.

[0024] **FIG. 1** illustrates a block diagram of a content detection system in accordance with some embodiments; and

[0025] **FIG. 2** is a diagram of a computer hardware system.

DETAILED DESCRIPTION

[0026] Various embodiments are described hereinafter with reference to the figures. It should be noted that the figures are not drawn to scale and that elements of similar structures or functions are represented by like reference numerals throughout the figures. It should also be noted that the figures are only intended to facilitate the description of specific embodiments. They are not intended as an exhaustive description of the invention or as a limitation on the scope of the invention. In addition, an illustrated embodiment may not show all aspects or advantages. An aspect or an advantage described in conjunction with a particular embodiment is not necessarily limited to that embodiment and can be practiced in any other embodiments, even if not so illustrated or described.

[0027] **FIG. 1** illustrates a block diagram of a content detection system **100** in accordance with some embodiments. The content detection system **100** includes a central station **102**, a processing station **104** for providing content detection data to the central station **102**, a plurality of base stations **106** in communication with the central station **102**, and a plurality of content detection modules **108** in communication with the base stations **106**.

[0028] In the illustrated embodiments, processing station **104** is a computer. Alternatively, processing station **104** can be a server, a module, a device, a computer program, and the like, e.g., any one of a variety of devices that can receive and transmit information. Processing station **104** is configured to determine content detection data, such as a virus signature, a spammer identification, a URL, and the like, and transmit the content detection data to central station **102**. For example, processing station **104** can be configured (e.g., programmed) to determine the content detection data using any of the techniques known in the art. Alternatively, the content detection data can be input into processing station **104** by a user of processing station **104**. Although one processing station **104** is shown, in other embodiments, content detection system **100** can include more than one processing station **104** in communication with central station **102**.

[0029] Central station **102** is configured to receive the content detection data from processing station **104**, and send the content detection data to update stations **106** (e.g., through the Internet). In some embodiments, central station **102** also receives subscriber data, such as a user identification of a content detection module **108**, level of protection desired by the user, etc., from processing station **104** or from update station(s) **106** for processing. In the illustrated embodiments, central station **102** is a computer, but alternatively, can be a server, a module, a device, a computer

program, and the like, e.g., any one of a variety of devices that can receive and transmit information. Although one processing station **102** is shown, in other embodiments, content detection system **100** can include more than one central station **102**, each of which in communication with at least one update station **106**. In other embodiments, central station **102** and processing station **104** are combined and implemented as a single unit (e.g., a processor, a computer, or the like).

[**0030**] Update stations **106** receive the content detection data from central station **102**, and send the content detection data to content detection modules **108** (e.g., through the Internet). Each of the update stations **106** is located at a geographical location that is different from others. For example, update station **106***a* may be located at a different building, a different street, a different city, or a different country, from update station **106***b*. In some embodiments, the update stations **106** also receives subscriber data, such as a user identification of a content detection module **108**, level of protection desired by the user, etc., from content detection module(s) **108**, and forward the subscriber data to central station **102** for processing. In other embodiments, update station **106** may be configured to handle requests (such as a subscriber's contract information, the latest update data, etc.) from content detection module(s) **108**, collect information (such as the version information, IP address, geographical location of the detection module, etc.) from content detection module(s) **108**, and forward collected information to central station **102**. In the illustrated embodiments, each update station **106** is a computer, but alternatively, can be a server, a module, a device, a computer program, and the like, e.g., any one of a variety of devices that can receive and transmit information. In **FIG. 1**, three update stations **106***a*-**106***c* and five content detection modules **108***a*-**108***e* are shown. However, in alternative embodiments, the system **100** can have different numbers of update station(s) **106** and different numbers of content detection module(s) **108**.

[**0031**] In the illustrated embodiments, each content detection module **108** is configured to receive electronic content (content data), and determines whether the electronic content contains undesirable content based on the content detection data it receives from update station **106**. For example, content detection module **108** can be configured to detect virus based on a virus signature received from update station **106**. In the illustrated embodiments, module **10** is implemented as a component of a gateway (or gateway product), which is configured to perform policy enforcement. As used in this specification, the term "policy enforcement" refers to a process or procedure, an execution of which creates a result that can be used to determine whether to pass data to user, and includes (but is not limited to) one or a combination of: source verification, destination verification, user authentication, virus scanning, content scanning (e.g., scanning for undesirable content), and intrusion detection (e.g., detecting undesirable content, such as worms, porno website, etc.). In other embodiments, instead of being a component of gateway, content detection module **108** can be a separate component that is coupled to gateway. In other embodiments, content detection module **108** can be a gateway product by itself.

[**0032**] In some embodiments, content detection module **108** can be implemented using software that is loaded onto a computer, a server, or other types of memory, such as a disk or a CD-ROM. Alternatively, content detection module **108** can be implemented as web applications. In alternative embodiments, content detection module **108** can be implemented using hardware. For example, in some embodiments, content detection module **108** includes an application-specific integrated circuit (ASIC), such as a semi-custom ASIC processor or a programmable ASIC processor. ASICs, such as those described in Application-Specific Integrated Circuits by Michael J. S. Smith, Addison-Wesley Pub Co. (1st Edition, June 1997), are well known in the art of circuit design, and therefore will not be described in further detail herein. In still other embodiments, content detection module **108** can be any of a variety of circuits or devices capable of performing the functions described herein. For example, in alternative embodiments, content detection module **108** can include a general purpose processor, such as a Pentium processor. In other embodiments, content detection module **108** can be implemented using a combination of software and hardware. In some embodiments, content detection module **108** may be implemented as a firewall, a component of a firewall, or a component that is configured to be coupled to a firewall.

[**0033**] Having described the components of the content detection system **100**, methods of using content detection system **100** in accordance with some embodiments will now be described. First, processing station **104** receives an electronic content. By means of non-limiting examples, such electronic content can be a web page, an email, an email attachment, a word file, a program, etc., and the like, e.g., a file that may contain undesirable content. In other examples, electronic content can be a virus, a spam, a worm, or any of other undesirable content. Processing station **104** can receive the electronic content from one or more sources. For example, a content detection module **108** may detect a content that is suspicious (or that requires further processing), in which case, content detection module **108** then sends the electronic content to processing station **104** for processing. Alternatively, processing station **104** can receive electronic content from a person, who sends the content to processing station **104** via email. In other embodiments, electronic content can be input into processing station **104** by a user of processing station **104**.

[**0034**] After processing station **104** received the electronic content, processing station **104** then analyzes such information to determine whether the content contains/is a threat (e.g., a virus, a worm, a spam, etc.) that is desired to be detected. If processing station **104** determines that the electronic content contains a threat that is desired to be detected, processing station **104** then generates content detection data for the electronic content. For example, after processing station **104** received a set of content data, processing station **104** then performs an analysis using conventional or known technique(s) to determine whether it is a virus (an example of content that is desired to be detected). In some embodiments, processing station **104** is programmed to perform such analysis. Alternatively, the set of content data can be analyzed by an administrator, a separate device, or a separate software, and the result of the analysis is then input to processing station **104**. If processing station **104** determines that the set of content data includes content that is undesirable (e.g., desired to be detected by content detection modules **108**), processing station then generates content detection data, which can be used by content detection modules **108** to detect the undesirable content. By means of

non-limiting examples, content detection data can be a virus signature, a virus definition, a spammer identification, a URL, a NIDS signature, a time at which content detection data is created, a level of threat, etc., and the like, e.g., any information that can be used in a content detection or screening process. In other embodiments, processing station **104** does not generate the content detection data. In such cases, content detection data can be provided by a separate source, and is input into processing station **104**.

[**0035**] As soon as, or shortly after, processing station **104** obtains the content detection data, processing station **104** then transmits the content detection data to central station **102**. If processing station **104** and central station **102** are implemented as a single unit, then the step of transmitting content detection data to central station **102** is omitted. In response to obtaining the content detection data, central station **102** initiates a transmission process for transmitting the content detection data to update stations **106**. In the illustrated embodiments, central station **102** maintains a list of prescribed geographical areas, a list of content detection modules **108** in each prescribed geographical area, and a list of update stations **106** for serving (e.g., sending content detection data to and/or from) each prescribed geographical area. Based on the lists, central station **102** assigns update stations **106** to provide the content detection data to content detection modules **108** within the prescribed geographical areas. In some embodiments, one update station **106** is used to serve content detection modules **108** within a prescribed geographical area. Alternatively, more than one update station **106** can be used to serve content detection modules **108** within a prescribed geographical area.

[**0036**] In some cases, an update station **106** can be configured to check another update station **106** to determine whether it has received content detection data. For example, if update station **106***a* determines that update station **106***b* did not receive content detection data, update station **106***a* then sends content detection data to update station **106***b*. Various techniques can be used to determine whether update station **106***b* received content detection data. For example, in some embodiments, update station **106***a* is configured to send an inquiry to update station **106***b*. If update station **106***b* did not receive content detection data, update station **106***b* then transmits a signal or a reply to update station **106***a*, indicating that update station **106***b* did not receive content detection data. Alternatively, update station **106***a* is configured to initiate a timer after it has received content detection data. The timer continues to run until update station **106***a* receives a signal from update station **106***b* indicating that update station **106***b* received content detection data. If update station **106***a* does not receive such signal from update station **106***b* within a prescribed time period, update station **106***a* then determines that update station **106***b* did not receive the content detection data. Other techniques known in the art can also be used to check whether update station **106***b* received content detection data. If it is determined that update station **106***b* did not receive content detection data, update station **106***a* then sends content detection data to update station **106***b*. It should be noted that in other embodiments, instead of having one update station check another update station, one update station can check a plurality of other update stations. Also, in other embodiments, more than one update station **106** can check another update station **106**.

[**0037**] In the illustrated embodiments, each of the update stations **106** are configured (e.g., pre-assigned) to serve one or more content detection module **108**. For example, update station **106***a* can be configured to serve content detection modules **108***a*, **108***b*, update station **106***b* can be configured to serve content detection module **108***c*, and update station **106***c* can be configured to serve content detection modules **108***d*, **108***e*.

[**0038**] In other embodiments, instead of pre-assigning update stations **106** to serve certain content detection modules **108**, central station **102** determines which update station **106** to use for sending content detection data based on a condition during use, e.g., based on load demands and/or capacities of update stations **106**. As used in this specification, "capacity" refers to a variable that represents or associates with a level of ability for an update station **104** to handle content transmitted thereto. For example, capacity of an update station **104** can be an amount of memory space available, etc. Using the example of **FIG. 1**, central station **102** receives information regarding capacities of update stations **106***a*-**106***c*, and selects one or more update stations **106** for transmitting content detection data based on their load and/or capacities. For example, if update station **106***a* has a high load demand (e.g., above a prescribed load demand) and/or if its remaining capacity to handle additional traffic is low (e.g., below a prescribed capacity threshold), central station **102** then uses update stations **106***b* and **106***c* to transmit content detection data to content detection modules **108***a*-**108***e*. Load on the update stations **106***b* and **106***c* can be approximately shared in equal portion. For example, if central station **102** determines that update stations **106***b* and **106***c* are available, central station **102** can assign update station **106***b* to transmit content detection data to modules **108***a* and **108***b*, and update station **106***c* to transmit content detection data to modules **108***a*-**108***c*. Alternatively, load among the available update stations **106** can be distributed based on the respective load demand and/or capacities of the available update stations **106**. For example, if update stations **106***b*, **106***c* have capacities to serve twenty (20) and eighty (80) content detection modules **108**, respectively, central station **102** then assign update stations **106***b*, **106***c* to transmit content detection data such that the ratio of the assigned loads approximately corresponds with the ratio of the capacities of the available update stations **106***b*, **106***c*. Following the above example, central station **102** will assign update station **106***b* to serve content detection module **108***a*, and update station **106***c* to serve content detection modules **108***b*-**108***e*.

[**0039**] In other embodiments, central station **102** maintains an order list of update station **106**, which prescribes an order (e.g., in a round-robin configuration) in which load is to be assigned to update stations **106**. For example, the order list may have update stations **106***a*-**106***c* as primary, secondary, and tertiary stations, respectively, for serving content detection modules **108***a*-**108***e*. In such cases, central station **102** will initially attempt to use update station **106***a* (the primary station) for transmitting content detection data to content detection modules **108***a*-**108***e*. However, if update station **106***a* is unavailable (e.g., due to heavy load demand), central station **102** will then attempt to use update station **106***b* (the secondary station) for transmitting content detection data to content detection modules **108***a*-**108***e*. If update station **106***b* is unavailable (e.g., due to heavy load demand), central station **102** will then attempt to use update station

106*c* (the third station on the order list) for transmitting content detection data to content detection modules **108***a*-**108***e*.

[**0040**] It should be noted that the technique for transmitting content detection data from central station **102** and/or update station(s) **106** to content detection module(s) **108** should not be limited to the examples discussed previously, and that other techniques can also be used in other embodiments. For example, one or more of the techniques described previously can be combined with another technique. Also, in other embodiments, central station **102** does not maintain the list of content detection modules **108** and the list of geographical areas. In such cases, after central station **102** receives content detection data, it transmits the content detection data to all update stations **106**. The update stations **106** are configured to coordinate among themselves to ensure that all content detection modules **108** are provided with the content detection data. For example, in the example of **FIG. 1**, update station **106***a* can be configured (e.g., programmed) to communicate with update station **106***b* for various purposes, such as, to check a load demand on update station **106***b,* to check a capacity of update station **106***b,* to check an availability of update station **106***b,* and/or to verify that update station **106***b* has received content detection data. In some embodiments, based on the load demand and/or the capacities on the update stations **106**, update stations **106** share the load among themselves (e.g., by dividing the load in equal parts, or by distributing the load based on respective ratios of the demand and/or capacities on the update stations **106**) to pass the content detection data to content detection modules **108**. In some embodiments, one update station **106** can be configured to communicate with one or more other update station **106**. In such cases, the update station **106** can check one or more other update station **106** to make sure that content detection data have been received, and/or to serve as backup for the one or more other update station **106**. In other embodiments, more than one update stations **106** can check an update station **106**, and serve as backup for the update station **106**.

[**0041**] After content detection modules **108** received the content detection data (e.g., a virus signature), content detection modules **108** can then utilize the content detection data to detect content. In some embodiments, the content detection data is a virus signature, in which case, content detection modules **108** utilizes the virus signature to detect the virus that corresponds with the virus signature. Alternatively, the content detection data is a spammer identification, in which case, content detection modules **108** utilizes the spammer identification to detect and screen undesirable spam that corresponds with the spammer identification. In other embodiments, the content detection data can be other information, such as, a time at which content detection data is created, that content detection modules **108** can use in a content detection or screening process.

[**0042**] Using the above method, content detection data can be provided to content detection modules **108** within a short period, such as, several minutes, and in some cases, within seconds, after the content detection data has been obtained (determined) by processing station **104** and/or central station **102**. This allows content detection modules **108** to be updated in substantially real time. This is advantageous because some content detection data such as virus definitions are very time-sensitive, and should be distributed to all content detection modules **108** as soon as the content detection data are available. Also, with system **100**, the responsibility to keep up with the latest security update (e.g., content detection data) is shifted from users of content detection modules **108** to processing station **104** and/or central station **102**. In addition, unlike typical update method, which requires a content detection module to regularly "poll" an update station to check if there is a new update, central station **102** and/or update stations **106**"push" the latest security update data within minutes (or even seconds) after they are available to all content detection modules **108**. This method has the advantage of faster response time during an outbreak and less resource consumption on content detection modules **108**.

[**0043**] Further, using a network of update stations **106** for transmitting content detection data is reliable because if update station(s) **106** is not available or fail to work properly, a nearby update station **106** in the same prescribed geographical area or update station(s) **106** located in other prescribed geographical area can provide the content detection data to content detection modules **108**. Also, with content detection system **100**, an update station **106** can be added, removed from the content detection system **100** at run-time without causing service interruption. If the update stations **106** for a certain geographical areas cannot keep up with the ever-increasing load, more update station(s) can be added to the content detection system **100**. As such, content detection system **100** provides high scalability.

[**0044**] In some embodiments, an update station can be customized to serve the need of certain organization(s). Some organizations have some special policies that restrict their network device's access to the Internet. For example, their network connection from Intranet to Internet is only limited to certain host(s). Therefore, it may not be possible for their content detection modules **108** inside the Intranet to access update station(s) **106**. In such cases, a customized update station can be provided outside the Intranet of the organization (customer). For example, the customer can configure [] an update station to serve its own content detection module(s) **108**. In some embodiments, a user interface can be provided for allowing a user to select which content detection module(s) **108** within the organization to use a customized update station and which content detection module(s) **108** to use a regular update station. As with update stations **106**, more than one customized update station can be provided, and these customized update stations can back up each other and distribute their load.

[**0045**] Computer Architecture

[**0046**] As described previously, any of central station **102**, processing station **104**, update station **106**, and content detection module **108** can be implemented using a computer. For example, one or more instructions can be imported into a computer to enable the computer to perform any of the functions described herein.

[**0047**] **FIG. 2** is a block diagram that illustrates an embodiment of a computer system **200** upon which embodiments of the invention may be implemented. Computer system **200** includes a bus **202** or other communication mechanism for communicating information, and a processor **204** coupled with bus **202** for processing information. Computer system **200** also includes a main memory **206**, such as a random access memory (RAM) or other dynamic storage

device, coupled to bus **202** for storing information and instructions to be executed by processor **204**. Main memory **206** also may be used for storing temporary variables or other intermediate information during execution of instructions to be executed by processor **204**. Computer system **200** may further include a read only memory (ROM) **208** or other static storage device(s) coupled to bus **202** for storing static information and instructions for processor **204**. A data storage device **210**, such as a magnetic disk or optical disk, is provided and coupled to bus **202** for storing information and instructions.

[**0048**] Computer system **200** may be coupled via bus **202** to a display **212**, such as a cathode ray tube (CRT), for displaying information to a user. An input device **214**, including alphanumeric and other keys, is coupled to bus **202** for communicating information and command selections to processor **204**. Another type of user input device is cursor control **216**, such as a mouse, a trackball, cursor direction keys, or the like, for communicating direction information and command selections to processor **204** and for controlling cursor movement on display **212**. This input device typically has two degrees of freedom in two axes, a first axis (e.g., x) and a second axis (e.g., y), that allows the device to specify positions in a plane.

[**0049**] Embodiments of the invention are related to the use of computer system **200** for transmitting content data. According to some embodiments of the invention, such use may be provided by computer system **200** in response to processor **204** executing one or more sequences of one or more instructions contained in the main memory **206**. Such instructions may be read into main memory **206** from another computer-readable medium, such as storage device **210**. Execution of the sequences of instructions contained in main memory **206** causes processor **204** to perform the process steps described herein. One or more processors in a multi-processing arrangement may also be employed to execute the sequences of instructions contained in main memory **206**. In alternative embodiments, hard-wired circuitry may be used in place of or in combination with software instructions to implement the invention. Thus, embodiments of the invention are not limited to any specific combination of hardware circuitry and software.

[**0050**] The term "computer-readable medium" as used herein refers to any medium that participates in providing instructions to processor **204** for execution. Such a medium may take many forms, including but not limited to, non-volatile media, volatile media, and transmission media. Non-volatile media includes, for example, optical or magnetic disks, such as storage device **210**. Volatile media includes dynamic memory, such as main memory **206**. Transmission media includes coaxial cables, copper wire and fiber optics, including the wires that comprise bus **202**. Transmission media can also take the form of acoustic or light waves, such as those generated during radio wave and infrared data communications.

[**0051**] Common forms of computer-readable media include, for example, a floppy disk, a flexible disk, hard disk, magnetic tape, or any other magnetic medium, a CD-ROM, any other optical medium, punch cards, paper tape, any other physical medium with patterns of holes, a RAM, a PROM, and EPROM, a FLASH-EPROM, any other memory chip or cartridge, a carrier wave as described hereinafter, or any other medium from which a computer can read.

[**0052**] Various forms of computer-readable media may be involved in carrying one or more sequences of one or more instructions to processor **204** for execution. For example, the instructions may initially be carried on a magnetic disk of a remote computer. The remote computer can load the instructions into its dynamic memory and send the instructions over a telephone line using a modem. A modem local to computer system **200** can receive the data on the telephone line and use an infrared transmitter to convert the data to an infrared signal. An infrared detector coupled to bus **202** can receive the data carried in the infrared signal and place the data on bus **202**. Bus **202** carries the data to main memory **206**, from which processor **204** retrieves and executes the instructions. The instructions received by main memory **206** may optionally be stored on storage device **210** either before or after execution by processor **204**.

[**0053**] Computer system **200** also includes a communication interface **218** coupled to bus **202**. Communication interface **218** provides a two-way data communication coupling to a network link **220** that is connected to a local network **222**. For example, communication interface **218** may be an integrated services digital network (ISDN) card or a modem to provide a data communication connection to a corresponding type of telephone line. As another example, communication interface **218** may be a local area network (LAN) card to provide a data communication connection to a compatible LAN. Wireless links may also be implemented. In any such implementation, communication interface **218** sends and receives electrical, electromagnetic or optical signals that carry data streams representing various types of information.

[**0054**] Network link **220** typically provides data communication through one or more networks to other devices. For example, network link **220** may provide a connection through local network **222** to a host computer **224**. Network link **220** may also transmits data between an equipment **226** and communication interface **218**. The data streams transported over the network link **220** can comprise electrical, electromagnetic or optical signals. The signals through the various networks and the signals on network link **220** and through communication interface **218**, which carry data to and from computer system **200**, are exemplary forms of carrier waves transporting the information. Computer system **200** can send messages and receive data, including program code, through the network(s), network link **220**, and communication interface **218**. Although one network link **220** is shown, in alternative embodiments, communication interface **218** can provide coupling to a plurality of network links, each of which connected to one or more local networks. In some embodiments, computer system **200** may receive data from one network, and transmit the data to another network. Computer system **200** may process and/or modify the data before transmitting it to another network.

[**0055**] Although particular embodiments have been shown and described, it will be understood that it is not intended to limit the present inventions to the preferred embodiments, and it will be obvious to those skilled in the art that various changes and modifications may be made without departing from the spirit and scope of the present inventions. The specification and drawings are, accordingly, to be regarded in an illustrative rather than restrictive sense. The present inventions are intended to cover alternatives,

modifications, and equivalents, which may be included within the spirit and scope of the present inventions as defined by the claims.

What is claimed:

1. A method of updating a content detection module, comprising:

obtaining content detection data; and

transmitting the content detection data to a content detection module;

wherein the transmitting is performed not in response to a request from the content detection module.

2. The method of claim 1, wherein the obtaining comprises analyzing content data to determine the content detection data.

3. The method of claim 1, wherein the content detection data comprises a virus signature, a spammer identification, or a URL.

4. The method of claim 1, wherein the content detection data comprises a time data indicating a time at which the content detection data is created.

5. The method of claim 1, wherein the content detection module is configured to detect network content based on the content detection data.

6. The method of claim 1, wherein the transmitting comprises sending the content detection data to an update station, and using the update station to transmit the content detection data to the content detection module.

7. The method of claim 1, wherein the transmitting comprises:

determining an update station for receiving the content detection data;

sending the content detection data to the update station; and

sending the content detection data from the update station to the content detection module.

8. A system for updating a content detection module, comprising:

means for obtaining content detection data; and

means for transmitting the content detection data to a content detection module;

wherein the means for transmitting is configured to perform the transmitting not in response to a request from the content detection module.

9. A computer-program product having a medium, the medium having a set of instructions readable by a processor, an execution of the instructions by the processor causes a process to be performed, the process comprising:

obtaining content detection data; and

transmitting the content detection data to a content detection module;

wherein the transmitting is performed not in response to a request from the content detection module.

10. A content detection system, comprising:

a station having a computer-readable medium for storing content detection data, the content detection data usable by a content detection module to detect content;

wherein the station is configured to transmit the content detection data not in response to a request by the content detection module.

11. The system of claim 10, wherein the station is a central station.

12. The system of claim 11, further comprising a first update station configured to receive the content detection data from the central station and send the content detection data to the content detection module.

13. The system of claim 12, further comprising a second update station configured to receive the content detection data from the central station.

14. The system of claim 13, wherein the first update station is configured to determine whether the second update station received the content detection data.

15. The system of claim 11, wherein the central station is configured to select an update station to which the central station transmits the content detection data.

16. The system of claim 10, wherein the station is an update station.

17. The system of claim 10, wherein the station is configured to transmit the content detection data in substantially real time.

18. The system of claim 10, wherein the station is selected from the group consisting of a computer, a server, a device, and a software.

19. The system of claim 10, wherein the content detection data comprises a virus signature, a spammer identification, or a URL.

20. A method of sending content detection data, comprising:

determining whether a first update station received the content detection data; and

sending the content detection data to the first update station if the first update station did not receive the content detection data.

21. The method of claim 20, wherein the determining is performed by a second update station in communication with the first update station.

22. The method of claim 20, wherein the determining comprises sending a query to the first update station, the query requesting for confirmation of receipt of the content detection data.

23. A system for sending content detection data, comprising:

means for determining whether a first update station received the content detection data; and

means for sending the content detection data to the first update station if the first update station did not receive the content detection data.

24. A computer-program product having a medium, the medium having a set of instructions readable by a processor, an execution of the instructions by the processor causes a process to be performed, the process comprising:

determining whether a first update station received the content detection data; and

sending the content detection data to the first update station if the first update station did not receive the content detection data.

25. A method of sending content detection data, comprising:

obtaining content detection data;

selecting an update station from a plurality of update stations; and

sending the content detection data to the selected update station.

26. The method of claim 25, wherein the selecting comprises:

determining a load on each of the plurality of update stations; and

choosing the update station that has the least load.

27. The method of claim 25, wherein the selecting comprises using an order list.

28. The method of claim 25, wherein the selecting is performed based at least on a geographical location of one of the plurality of update stations.

29. A system for sending content detection data, comprising:

means for obtaining content detection data;

means for selecting an update station from a plurality of update stations; and

means for sending the content detection data to the selected update station.

30. A computer-program product having a medium, the medium having a set of instructions readable by a processor, an execution of the instructions by the processor causes a process to be performed, the process comprising:

obtaining content detection data;

selecting an update station from a plurality of update stations; and

sending the content detection data to the selected update station.

31. A method of building a content detection system, comprising:

establishing a first communication link between a central station and an update station, the central station configured to transmit content detection data to the update station; and

establishing a second communication link between the update station and a content detection module.

32. The method of claim 31, wherein the central station is selected from the group consisting of a computer, a server, a device, and a software.

33. The method of claim 31, wherein the update station is selected from the group consisting of a computer, a server, a device, and a software.

34. The method of claim 31, wherein the content detection data comprises a virus signature, a spammer identification, or a URL.

35. The method of claim 31, wherein the content detection data comprises a time data indicating a time at which the content detection data is created.

36. The method of claim 31, wherein each of the steps of establishing comprises creating a network connection.

37. A system for building a content detection system, comprising:

means for establishing a first communication link between a central station and an update station, the central station configured to transmit content detection data to the update station; and

means for establishing a second communication link between the update station and a content detection module.

38. A computer-program product having a medium, the medium having a set of instructions readable by a processor, an execution of the instructions by the processor causes a process to be performed, the process comprising:

establishing a first communication link between a central station and an update station, the central station configured to transmit content detection data to the update station; and

establishing a second communication link between the update station and a content detection module.

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